Annexure – I

CREDIT FRAMEWORK STRUCTURE

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	7	7	-	-	-	-	-	-	14
Engineering Science Course		6	6	-	-	-	-	-	-	12
Program Core Course (PCC)	Program Courses	2	2	13	10	7	4	6		44
Program Elective Course (PEC)		-	-	-	-	4	6	6	4	20
Multidisciplinary Minor (MDM)	Multidisciplinary Courses	-	-	2	3	3	3	3	-	14
Open Elective (OE) Other than a particular program		-	-	-	-	2	3	3	-	08
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	-	2	1	1	2	2	-	-	08
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	1	1	-	-	2	-	-	-	04
Entrepreneurship/Economics/Management Courses		-	-	2	2	-	-	-	-	04
Indian Knowledge System (IKS)		2	-	-	-	-	-	-	-	02
Value Education Course (VEC)		-	-	2	2	-	-	-	-	04
Research Methodology	Experiential Learning Courses	-	-	-	-	-	-	-	4	04
Comm. Engg. Project (CEP)/ Field Project (FP)		-	-	-	2	-	-	-	-	02
Project		-	-	-	-	-	2	2	-	04
Internship/OJT		-	-	-	-	-	-	-	12	12
Co-curricular Courses (CC)	Liberal Learning Courses	2	2	-	-	-	-	-	-	04
Total Credits (Major)		20	20	20	20	20	20	20	20	160

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COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

FIRST SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	BSC	**26DS101T**	Engineering Chemistry	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
2.	BSC	**26DS101P**	Engineering Chemistry Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
3.	BSC	**26DS102T**	Linear Algebra and Calculus	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
4.	BSC	**26DS102P**	Linear Algebra and Calculus Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
5.	ESC	**26DS103T**	Logic building using C	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
6.	ESC	**26DS103P**	Logic building using C Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
7.	ESC	**26DS104T**	Digital Electronics	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
8.	ESC	**26DS104P**	Digital Electronics Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
9.	PCC	**26DS105P**	Data Science workshop – I Lab	**-**	**-**	**4**	**2**	**-**	**25**	**25**	**50**	**25**	**-**
10.	AEC	**26DS106P**	Business Communication Skills – I Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
11.	IKS	**26DS107T**	Indian Knowledge Systems #	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
12.	CC	**26DS108P**	Co-curricular Courses - I	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**25**	**-**
Total				**11**	**-**	**18**	**20**	**60**	**260**	**330**	**650**	**-**	**-**

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COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

SECOND SEMESTER

Sr. No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Semester Examination	Total		
1.	BSC	**26DS201T**	Engineering Physics and Materials Science	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
2.	BSC	**26DS201P**	Engineering Physics and Materials Science Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
3.	BSC	**26DS202T**	Statistics and Probability	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
4.	BSC	**26DS202P**	Statistics and Probability Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
5.	ESC	**26DS203T**	Data Structures	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
6.	ESC	**26DS203P**	Data Structures Lab	**-**	**-**	**2**	**1**		**25**	**25**	**50**	**25**	**-**
7.	ESC	**26DS204T**	Introduction to Data Science	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
8.	PCC	**26DS205P**	Data Science workshop – II Lab	**-**		**4**	**2**	**-**	**25**	**25**	**50**	**25**	**-**
9.	**AEC**	**26DS206P**	Business Communication Skills – II Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
10.	**SEC**	**26DS207T**	Design Thinking #	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
11.	**CC**	**26DS208P**	Co-curricular Courses – II	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**25**	**-**
Total				**12**	**-**	**16**	**20**	**70**	**245**	**335**	**650**	**-**	**-**

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THIRD SEMESTER

Sr. No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Semester Examination	Total		
1.	PCC	**26DS301T**	Mathematics for Data Science	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
2.	PCC	**26DS302T**	Computer Architecture and Organization	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
3.	PCC	**26DS303T**	Database Management Systems	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
4.	PCC	**26DS303P**	Database Management Systems Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
5.	PCC	**26DS304P**	Data Acquisition and Internet of Things Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
6.	PCC	**26DS305P**	Web Technology Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
7.	PCC	**26DS306P**	Data Science Workshop – III Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
8.	VEC	**26DS307T**	Constitution of India	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
9.	HSSM	**26DS308T**	Fundamentals of Entrepreneurship	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
10.	SEC	**26DS341P**	Career Development – I	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**25**	**-**
11.	MDM	**26DS331M**	MDM-I (Refer MDM basket)#	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
			Total	**16**	**-**	**10**	**20**	**90**	**240**	**370**	**700**	**-**	**-**

 # Course to be conducted online through NPTEL

Multidisciplinary Minor-I	
26DS331M	

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COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

FOURTH SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No. of Hrs for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	26DS401T	Analysis of Algorithms	3	-	-	3	20	20	60	100	45	3
2.	PCC	26DS401P	Analysis of Algorithms Lab	-	-	2	1	-	25	25	50	25	
3.	PCC	26DS402T	Object Oriented Programming	3	-	-	3	20	20	60	100	45	3
4.	PCC	26DS402P	Object Oriented Programming Lab	-	-	2	1	-	25	25	50	25	
5.	PCC	26DS403P	Data Handling and VisualizationLab	-	-	2	1	-	25	25	50	25	
6.	PCC	26DS404P	Data Science Workshop– IV Lab	-	-	2	1	-	25	25	50	25	
7.	VEC	26DS406T	Environmental Science	2	-	-	2	10	10	30	50	23	1.5
8.	HSSM	26DS407T	Fundamentals of Economics and Management	2	-	-	2	10	10	30	50	23	1.5
9.	SEC	26DS441P	Career Development - II	-	-	2	1	-	50	-	50	-	-
10.	CEP	26DS405P	Mini Project*	-	-	4	2	-	50	-	50	-	-
11.	MDM	26DS431M	MDM-II (Refer MDM basket)#	3	-	-	3	20	20	60	100	45	3
			Total	13	-	14	20	80	280	340	700	-	-

*** Field Project or Community engagement project in the major discipline**

 # Course to be conducted online through NPTEL

Multidisciplinary Minor-II	
26DS431M	

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COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

FIFTH SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	**26DS501T**	Operating Systems	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
2.	PCC	**26DS502T**	Machine Learning	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
3.	PCC	**26DS502P**	Machine Learning Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
4.	PCC	**26DS503P**	Data Science Workshop – V Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
5.	PEC	**26DS504T**	Program Elective – I (Refer PEC basket)	**2**	**-**		**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
6.	PEC	**26DS504P**	Program Elective – I Lab (Refer PEC basket)	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
7.	PEC	**26DS505P**	Program Elective – II Lab (Refer PEC basket)	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
8.	VSC	**26DS506P**	Technical Skill Development - I	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**-**	**-**
9.	AEC	**26DS541P**	English for Engineers	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**-**	**-**
10.	MDM	**26DS531M**	MDM – III (Refer MDM basket)#	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
11.	OE	**26DS561O**	Open Elective – I (Refer OE basket)	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**23**	**1.5**
			Total	**12**	**-**	**16**	**20**	**70**	**270**	**310**	**650**	**-**	**-**

Course to be conducted online through NPTEL

Multidisciplinary Minor-III	
26DS531M	
Open Elective – I	
26DS561O	Data Analytics

Program Elective – II Lab	
26DS505P (i)	Data Center and Cloud Computing Lab
26DS505P (ii)	Information Extraction and Retrieval Lab

Program Elective – I Lab	
26DS504P (i)	Software Engineering Lab
26DS504P (ii)	Decision Support System and Intelligent System Lab

Program Elective – I	
26DS504T (i)	Software Engineering
26DS504T (ii)	Decision Support System and Intelligent System

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COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

SIXTH SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	**26DS601T**	Deep Learning	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
2.	PCC	**26DS601P**	Deep Learning Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
3.	PEC	**26DS602T**	Program Elective – III (Refer PEC basket)	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
4.	PEC	**26DS603P**	Program Elective – IV Lab (Refer PEC basket)	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**25**	**-**
5.	PEC	**26DS604P**	Program Elective – V Lab (Refer PEC basket)	**-**	**-**	**4**	**2**	**-**	**25**	**25**	**50**	**25**	**-**
6.	PROJ	**26DS605P**	Project - I	**-**	**-**	**4**	**2**	**-**	**50**	**50**	**100**	**50**	**-**
7.	VSC	**26DS606P**	Technical Skill Development - II	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**-**	**-**
8.	MDM	**26DS631M**	MDM – IV (Refer MDM basket)#	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
9.	OE	**26DS661O**	Open Elective – II (Refer OE basket)	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**45**	**3**
			Total	**12**	**-**	**16**	**20**	**80**	**255**	**365**	**700**	-	-

Course to be conducted online through NPTEL

Multidisciplinary Minor-IV	
26DS631M	
Open Elective – II	
26DS661O (i)	Business Intelligence

Program Elective – III	
26DS602T (i)	Soft Computing
26DS602T (ii)	Computer Network
26DS602T (iii)	Bioinformatics

Program Elective – IV Lab	
26DS603P (i)	Full Stack Development Lab
26DS603P (ii)	Natural Language Processing Lab

Program Elective – V Lab	
26DS603P (i)	Data Modeling and Simulation Lab
26DS603P (ii)	Advanced Java Programming Lab

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SEVENTH SEMESTER

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	PCC	**26DS701T**	Theory of Computation	**3**	**-**	**-**	**3**	20	20	60	100	45	3
2.	PCC	**26DS702P**	Cloud-Based Data Science and DevOps for ML Lab	**-**	**-**	**4**	**2**	-	25	25	50	25	-
3.	PCC	**26DS703P**	Data Science Workshop – VII	**-**	**-**	**2**	**1**	-	25	25	50	25	-
4.	PEC	**26DS704T**	Program Elective – VI (Refer PEC basket)	**2**	**-**	**-**	**2**	10	10	30	50	23	1.5
5.	PEC	**26DS704P**	Program Elective - VI Lab (Refer PEC basket)	**-**	**-**	**2**	**1**	-	25	25	50	25	-
6.	PEC	**26DS705T**	Program Elective – VII (Refer PEC basket)	**3**	**-**	**-**	**3**	20	20	60	100	45	3
7.	PROJ	**26DS706P**	Project – II	**-**	**-**	**4**	**2**	-	50	50	100	50	-
8.	MDM	**26DS731M**	MDM – V (Refer MDM basket)#	**3**	**-**	**-**	**3**	20	20	60	100	45	3
9.	OE	**26DS761O**	Open Elective – III (Refer OE basket)	**3**	**-**	**-**	**3**	20	20	60	100	45	3
			Total	**14**	**-**	**12**	**20**	**90**	**215**	**395**	**700**	-	-

Course to be conducted online through NPTEL

Multidisciplinary Minor-V	
26DS731M	
Open Elective – III	
26DS761O (i)	Android App Development

Program Elective – VI	
26DS704T (i)	Big Data Analytics and Business Intelligence
26DS704T (ii)	Predictive Analytics

Program Elective – VI Lab	
26DS704P (i)	Big Data Analytics and Business Intelligence Lab
26DS704P (ii)	Predictive Analytics Lab

Program Elective – VII	
26DS705P (i)	Data Warehousing and Mining
26DS705P (ii)	Cyber Security for Data Science

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EIGHTH SEMESTER

Option A

Sr. No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration of ESE (hrs.)
				L	T	P		Mid Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	RM	26DS801T	Research Methodology#	2	-	-	2	10	10	30	50	23	1.5
2.	RM	26DS801P	Research Methodology Lab#	-	-	4	2	-	25	25	50	25	-
3.	PEC	26DS802T	Program Elective – VIII#	3	-	-	3	20	20	60	100	45	3
4.	PEC	26DS802P	Program Elective – VIII Lab#	-	-	2	1	-	25	25	50	25	-
5.	OJT	26DS804P(i)	Industry/Research Internship*	-	-	24	12	-	200	200	400	200	-
			Total	5	0	30	20	30	280	340	650	-	-

Option B

Sr. No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	Duration of ESE (hrs.)
				L	T	P		Mid Sem Examination	Continual Assessment	End Sem Examination	Total		
1.	RM	26DS801T	Research Methodology#	2	-	-	2	10	10	30	50	23	1.5
2.	RM	26DS801P	Research Methodology Lab#	-	-	4	2	-	25	25	50	25	-
3.	PEC	26DS802T	Program Elective – VII#	3	-	-	3	20	20	60	100	45	3
4.	PEC	26DS802P	Program Elective – VIII Lab#	-	-	2	1	-	25	25	50	25	-
5.	ELC	26DS804P(ii)	Institutional Internship$ and Project – III	-	-	24	12	-	200	200	400	200	-
			Total	5	0	30	20	30	280	340	650		1.5

Option B is available to students only after recommendation of the concerned Head of the department. The project and internship should contribute towards career development plan of the students.

 # Courses to be mapped with NPTEL/SWAYAM/MOOC offered courses in that semester.

*** One semester internship in any industry/ Research Institute is to be carried out.**

$ One Semester Internship offered by Institute Level Cells such as TPDC/ IEDC / E-Yantra/ Team Ashwa Riders along with project in the Major Discipline assigned by department to be carried out.

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Basket for Multi-Disciplinary Minor Courses (MDM)

A. Computer Science and Engineering (Data Science)

Semester	Course Category	Course Code	Name of Course	Subject Expert Name	Weeks	Credits
III	MDM-I	26DS331M	Data Analytics with Excel	MDM-I	8	2
IV	MDM-II	26DS431M	Data Analytics with R	MDM-II	12	3
V	MDM-III	26DS531M	Data Engineering	MDM-III	12	3
VI	MDM-IV	26DS631M	Data Modelling and SQL	MDM-IV	12	3
VII	MDM-V	26DS731M	Tools for Data Science	MDM-V	12	3

Basket for Program Elective Courses (PEC)

B. Computer Science and Engineering (Data Science)

Semester	Course Category	Course Code	Name of Course	Credits
V	PEC-I	26DS504T(i)	Software Engineering	2
V	PEC-I	26DS504T(ii)	Decision Support System and Intelligent System	2
V	PEC-I Lab	26DS504P(i)	Software Engineering Lab	1
V	PEC-I Lab	26DS504P(ii)	Decision Support System and Intelligent System Lab	1
V	PEC-II Lab	26DS505P(i)	Data Center and Cloud Computing Lab	1
V	PEC-II Lab	26DS505P(ii)	Information Extraction and Retrieval Lab	1
VI	PEC-III	26DS602T (i)	Soft Computing	3
VI	PEC-III	26DS602T (ii)	Computer Network	3
VI	PEC-III	26DS602T (iii)	Bioinformatics	3
VI	PEC-IV Lab	26DS603P (i)	Full Stack Development Lab	1
VI	PEC-IV Lab	26DS603P (ii)	Natural Language Processing Lab	1
VI	PEC-V Lab	26DS604P (i)	Data Modeling and Simulation Lab	2
VI	PEC-V Lab	26DS604P (ii)	Advanced Java Programming Lab	2
VII	PEC-VI	26DS704T (i)	Big Data Analytics and Business Intelligence	2
VII	PEC-VI	26DS704T (ii)	Predictive Analytics	2
VII	PEC-VI Lab	26DS704P (i)	Big Data Analytics and Business Intelligence Lab	1
VII	PEC-VI Lab	26DS704P (ii)	Predictive Analytics Lab	1
VII	PEC-VII	26DS705T(i)	Data Warehousing and Mining	3
VII	PEC-VII	26DS705T(ii)	Cyber Security for Data Science	3
VIII	PEC-VIII	26DS802T (i)	Natural Language Processing	3
VIII	PEC-VIII	26DS802T (ii)	GenAI	3
VIII	PEC-VIII Lab	26DS802P (i)	Natural Language Processing Lab	1
VIII	PEC-VIII Lab	26DS802P (ii)	GenAI Lab	1

Basket for Open Elective Courses (OE)

C. Computer Science and Engineering (Data Science)

Semester	Course Category	Course Code	Name of Course	Credits
V	OE-I	26DS561O (i)	Data Analytics	2
VI	OE-II	26DS661O(i)	Business Intelligence	3
VII	OE-III	26DS761O(i)	Android App Development	3

EXIT OPTIONS

Award of UG Certificate in Major with 40 credits and an additional 8 credits (After First Year)

EXIT COURSES			
S.N.	**Course name**	**Mode of conduction**	**Credits**
1.	Data Science For Engineers By Prof. Ragunathan Rengasamy, Prof. Shankar Narasimhan | IIT Madras	NPTEL Swayam	2
2.	Foundation of Data Science By Dinesh Kumar | Indian Institute of Management Bangalore (IIMB)	NPTEL Swayam	2
3.	Internship	Offline/Online	4

Award of UG Diploma in Major with 80credits and an additional 8 credits (After Second Year) (Any Two)

EXIT COURSES			
S.N.	**Course name**	**Mode of conduction**	**Credits**
1.	Introduction to Machine Learning By Prof. Balaraman Ravindran | IIT Madras	NPTEL Swayam	4
2.	Internship	Offline/Online	4
3.	Introduction to Machine Learning By Prof. Balaraman Ravindran | IIT Madras	NPTEL Swayam	4

Award of UG Degree in Major with 120credits and an additional 8 credits (After Third Year)

EXIT COURSES			
S.N.	**Course name**	**Mode of conduction**	**Credits**
1.	Cloud Computing	NPTEL Swayam	4
2.	Internship	Offline/Online	4